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**Declaration under Rule 4.17:**

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(54) Title: METHOD AND COMPOSITION FOR USING STABILIZED BETA-CAROTENE AS CETANE IMPROVER IN HYDROCARBONACEOUS DIESEL FUELS

(57) Abstract: A diesel fuel additive is provided that includes beta-carotene stabilized with 2,2,4-trimethyl-6-ethoxy-1,2-dihydroquinoline. The additive may be added to any liquid hydrocarbon fuel, solid hydrocarbon fuel, or other hydrocarbonaceous combustible fuel to reduce emissions of undesired components during combustion of the fuel, provide improved fuel economy, engine cleanliness, and/or performance. A method for preparing the additive is also provided.

WO 2003/104360 A3

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/18282

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C10L 1/14, 1/22

US CL : 44/307, 308, 324, 448, 449, 451

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 44/307, 308, 324, 448, 449, 451

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EAST; beta carotene, 2,2,4-trimethyl-6-ethoxy-1,2-dihydroquinoline, diesel fuel, gasoline fuel, nitrate

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,638,324 B2 (JORDAN) 28 October 2003 (28.10.2003), abstract, and claims.	1-30
Y	US 6,193,766 B1 (JORDAN) 27 February 2001(27.02.2001), abstract, Examples 1-2 and claims.	1-30
Y	US 5,826,369 A (JORDAN) 27 October 1998 (27.10.1998), abstract, Examples, Tables and claims.	1-30
Y	US 4,274,835 A (JORDAN) 23 June 1981 (23.06.1981), abstract, claims.	1-30
Y	US 4,839,188 A (WHEELER)13 June 1989 (13.06.1989), abstract; column. 1, lines 67-68 and claims	1-30
Y	US 5,891,491 A (OWENS et al) 06 April 1999 (06.04.1999), abstract.	1-30

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Further documents are listed in the continuation of Box C.

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See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

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